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Updates earlier Office of Education circulars on cooperative education—organized programs integrating college classroom work and practical industrial experience. Describes the "co-op" plan, its operation, fields of study, educational levels, basic objectives, and administrative and operating requirements. Includes roster of "co-op" programs in various curriculums during 1957–58.

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COOPERATIVE EDUCATION IN THE UNITED STATES

by Henry H. Armsby*

This circular constitutes the second temporary substitute for Bulletin 1954, No. 11, "Cooperative Education in the United States" (out of print). It adds certain cooperative programs which have come to the attention of the writer since the publication of the 1954 bulletin and of the first temporary substitute (Circular No. 463) dated November 1955. It is hoped that this circular may be revised on an annual or biennial basis until a new bulletin can be prepared, containing more detailed information on the basic philosophy, objectives, and growth of this relatively new system of education, its administrative and operating problems, an outline of current institutional programs, and a discussion of the utilization of the plan by Federal agencies.

An educational problem of long standing is that of trying to give college students, especially in curriculums preparing for the professions, a knowledge of society and of social processes which persons called to occupy positions of leadership may need as much as they need technical knowledge and skills. The continued growth of industry, both in size and in complexity, increases the urgency of this problem.

The cooperative plan of education discussed in this circular may, under propitious local conditions, provide one workable solution to this problem.

DEFINITION OF COOPERATIVE PLAN

Basically the cooperative (hereafter called "co-op") plan is defined as an integration of classroom work and practical industrial experience in an organized program under which students alternate periods of attendance at college with periods of employment in industry, business, or government. The employment constitutes a regular continuing and essential element in the educational process, and some minimum amount of employment and minimum standard of performance are included in the requirements for a degree. The plan requires that the student's employment be related to some phase of the branch or field of study in which he is engaged, and that it be diversified in order to afford a spread of experience. It requires further that his industrial work shall increase in difficulty and responsibility as he progresses through his college curriculum, and in general shall parallel as closely as possible his progress through the academic phases of his education.

*Chief for Engineering Education, Division of Higher Education.

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OPERATION OF CO-OP PLAN

The co-op plan generally operates as follows: A full-time job in an industrial concern or governmental agency is shared by two students, one of whom works while his partner or "alternate" attends college. At the end of a certain period of time the two change places. Thus the job is kept continuously filled, and each student spends about half of his time in college. The length of the period of alternation varies in different institutions, as do the total amount of work experience required and the point in the student's curriculum at which it starts.

While the "two-man team" principle is generally observed in co-op programs, it is not universally followed and is not a fundamental principle of the co-op system. In some institutions all co-op students go to work at the same time. In individual situations only one co-op student is provided for a given job, which is handled so as to permit him to return to college for the regular class periods. The essential feature is not the "pairing" of students, but the alternation between job and school.

FIELDS OF STUDY AND EDUCATIONAL LEVELS

The co-op plan was originally designed for the education of engineers, and it still finds its widest use in engineering colleges. The plan is probably more directly and easily applicable to engineering than to most other fields, although it is finding increasing favor in schools of business administration, and it has been extended in some institutions to curriculums in architecture, science, education, home economics, the arts and sciences, and other fields.

The plan is also in use in a number of technical institutes, some of these programs being among the oldest and largest in the country. It has found limited application in junior colleges, and in at least two institutions at the graduate level.

DEVELOPMENT OF THE PROGRAM

The co-op plan was inaugurated in 1906 by Herman Schneider, professor and later dean of engineering at the University of Cincinnati, and has since been adopted by many other institutions. During World War II a number of institutions dropped the program because of difficulties in the placement of students. Some of these programs have been reinstated, and many new ones have been established since the war.

The latest and most complete roster of co-op programs was prepared in 1958 by the Editor of The College Blue Book, with the collaboration of the author of this circular. The roster was published in the 9th Edition of The College Blue Book, and with the permission of the editor, has been used as the chief source of the detailed listing of institutions appearing in this circular, as well as the statistical information which follows.

The Blue Book lists 57 accredited institutions which, during the academic year 1957-58, offered co-op programs of four or more years leading to the baccalaureate degree, and 45 institutions which offered programs of less than four years, leading to certificates, diplomas, or associate degrees. Four institutions offered programs at both levels, so that 98 different institutions are involved. A few of these institutions supplied incomplete data, but those which reported are listed in detail in tables 1 and 2, which follow.

In the programs leading to the baccalaureate degree, the total co-op enrollment averaged 590 per institution, with a range of from one student to 5,276. These colleges cooperated with an average of 90 firms or governmental agencies per institution, with a range of from 1 to 800. The number of baccalaureate degrees conferred on co-op students averaged 154 per institution, with a range of from 0 to 715.

In the programs of less than four years, total co-op enrollment averaged 198 per institution, with a range of from 6 students to 1,162. The institutions cooperated with an average of 43 firms or governmental agencies per institution, with a range of from 1 to 162. The number of certificates, diplomas, and associate degrees conferred on co-op students averaged 117 per institution, with a range of from 1 to 614.

BASIC OBJECTIVES OF CO-OP EDUCATION

The Division of Cooperative Engineering Education of the American Society for Engineering Education has adopted a report entitled "The Cooperative System -- A Manifesto" as the official statement of policy for the division and for the co-op institutions holding membership in the Society. The manifesto sets forth the belief that co-op and non-co-op colleges seek identical ultimate educational aims, and discusses five auxiliary purposes especially appropriate to cooperative institutions upon which the cooperative schools have agreed. They are: (1) to impart firsthand an actual knowledge of and experience with the execution in industry of engineering designs, projects, and developments; (2) to impart understanding of and familiarity with the problems and viewpoints of working men and women; (3) to assist students, by direct and personal experience in industry, to test their aptitude for engineering careers; (4) to enable engineering students to adjust themselves to engineering employments by gradual and easy transition from academic pursuits and mode of life to the requirements and conditions of industry; (5) to train and otherwise prepare students especially and directly for the administrative and operating functions which, to a greater or less degree, enter into most engineering careers.

ADMINISTRATIVE AND OPERATING REQUIREMENTS

The operation of the co-op plan affects all departments of an institution, and nothing less than the authority and influence of the highest administrative officers and the support of the teaching staff will

fully implement its objectives. This is especially important if the institution operates only a part of its program cooperatively, in which case the co-op plan must be closely integrated with the basic curriculums and programs of the institution, and this integration must be recognized and endorsed by all concerned.

Emphasis on educational values. The most important concept of the co-op plan is that educational and training values must be the paramount consideration in the placement of students. Each job must yield educational values; must fit the student's field of study, vocational aims, capacities, interests, and personality; and must supplement and vitalize his theoretical instruction. There must also be a proper sequence of jobs designed to constitute a steady progression from subordinate tasks directly in contact with labor and raw materials into positions of responsibility in management, design, accounting, or some other phase of industry in which a complicated process is seen as a whole. Earnings, convenience of location or transportation, working conditions, and personal preferences of the student must yield to educational advantages, if these advantages cannot otherwise be achieved. Above all the student must be inspired to make the most of his work experiences, to gain not only technical knowledge, but also social and economic knowledge which will tend to make him a more valuable and capable citizen than he would be without it.

It is essential that the executives and supervisory personnel of cooperating firms understand and endorse the basic objectives of the co-op system as an educational program. There must be no exploitation of the student by the employer, who must not sacrifice educational purposes to immediate employment needs. On the other hand, the student must meet all employment requirements, without special privileges.

Supervision of employment. An adequate system of controls is needed to insure that employer and student responsibilities are recognized and properly discharged. This requires that the employment of co-op students be as closely supervised as is their academic work. This supervision should include frequent check with each student's employer and if necessary with his immediate supervisor, regular conferences with students concerning progress, employment conditions, and character of duties, and adequate employment records and reports.

Patterns of organization and administration. In conformity with the tradition of institutional freedom, the co-op programs in various institutions, while exhibiting the same basic philosophy of objectives and operating requirements, have developed with many differences in details of organization and administration. Some institutions operate exclusively on the co-op plan, while others conduct co-op and regular plans side by side. Co-op institutions operate on the semester, the quarter, and various other calendars. The work period varies in different institutions from a half-day to a semester, or longer in some cases. A few co-op curriculums leading to the baccalaureate degree can be completed in 4 years, but most require 5 years, and a small number cover 6 years.

Most co-op institutions require students to complete the freshman year in the classroom before entering on co-op employment. This permits a general grounding in business and industrial problems, and provides opportunity for the student and his teachers and coordinators to discover his interests, abilities, and general qualifications.

Coordination. By far the most important elements in the organization and administration of the co-op plan are the functions performed by the persons called coordinators. These persons, who are members of the school staff, serve as a combination of placement bureau, job supervisors, student counselors, labor mediators, scheduling officers, curriculum builders, and teachers. The success or failure of the co-op plan depends largely upon their intelligence, initiative, industry, and ability to inspire students. In larger institutions there will generally be found a staff of coordinators and in some a dean of cooperative education.

In the early days of the program the coordinator visited each student at his job, but with the increased complexity of modern industry and the great variety of work done by co-op students it would now be almost impossible for any one coordinator to be a specialist in all the types of work in which his students are engaged. In addition, in many plants visits to students on the job are forbidden by the management, and even if permitted they might make the student unpleasantly conspicuous in the eyes of his co-workers.

The co-op schools use a variety of devices which they have found effective in helping the student get the greatest educational value from his industrial experience. Among these are orientation classes conducted before the beginning of employment, coordination class during employment, oral and written work reports by students, employer evaluation of students, and placement of each student in a variety of jobs to help determine his fitness and liking for some particular kind of work.

COSTS OF CO-OP PLAN

No comprehensive and reliable data are available which would enable a valid comparison to be made between unit costs under the co-op and regular plans. The program of coordination, which has been pointed out as the most important part of the plan, is admittedly expensive, but on the other hand only part of the upper-class students are in class at any one time, and therefore the requirements for space, equipment, and staff in upper-class engineering courses are considerably less under the co-op plan than under the regular plan. The multiple shifting of students from work to classes and vice versa involves additional administrative expense and indirect costs to the college and to the cooperating industries. Nevertheless, at least three institutions require a payment from the cooperating company as a basis for operating the program.

VALUES INHERENT IN THE CO-OP PLAN

The co-op plan, under propitious local conditions, can combine practical industrial experience with theoretical instruction in such a way that each reinforces the other. It can also provide students with many opportunities to study and practice human relations as they exist in industry. It can thus be an effective means of developing personnel for the administrative and operating side of industry.

Not even the co-op schools would contend that their plan should be adopted by all schools, or even by all schools of engineering, or that it will fit all industries. Indeed, it is generally agreed that no institution should even experiment with the system unless abundant opportunity for co-op employment is readily available. Experience has shown that firms having thousands of employees are generally able to absorb only a few dozen co-op student workers.

A co-op program which is organized and administered with proper attention to educational values, with adequate supervision of students' employment as well as their academic work, and with the wholehearted cooperation of the employers and the institution, can result in important values to the student, to the institution, and to the employers served.

CURRENT CO-OP PROGRAMS LEADING TO THE BACCALAUREATE DEGREE

Table 1 is a detailed tabulation of the co-op programs of four or more years, leading to baccalaureate degrees, which were offered during the academic year 1957-58. During that year 57 accredited institutions offered a total of 201 programs of four or more years leading to baccalaureate degrees in 17 different engineering curriculums, and 106 such programs in 21 different nonengineering curriculums.

The total number of programs offered under each engineering or nonengineering curriculum are shown at the bottom of the table.

CURRENT CO-OP PROGRAMS OF LESS THAN FOUR YEARS

Table 2 is a detailed tabulation of the cooperative programs of less than four years, leading to certificates, diplomas, or associate degrees, which were offered during the academic year 1957-58. At this level 45 accredited institutions offered 46 programs in 9 different engineering curriculums, and 73 programs in 17 different nonengineering curriculums.

As in table 1, the total number of institutions offering each individual curriculum is indicated at the bottom of the table.

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Table 2.--Curriculums of Less than 4 Years Leading to Diplomas, Certificates, or Associate Degrees, 1957-58[1/]

INSTITUTION	ENGINEERING																			SCIENCE							ART				BUSINESS							MISCELLANEOUS									
	Aeronautical	Agricultural	Architectural	Ceramic	Chemical	Civil	Electrical	General	Geological	Industrial	Mechanical	Metallurgical	Mining	Nuclear	Petroleum	Science	Textile	Biology	Chemistry	Electronics	Mathematics	Physics	Science	Applied Arts	Arts	Design	Liberal Arts	Accounting	Administration	Distribution	Finance & Ins.	Marketing	Retailing	Secretarial	Bldg. Construction	Drafting	Education	Home Economics	Photography	Practical Nursing	Social Science	Technology
CALIFORNIA																																														
Hartnell Jr. Coll., Salinas	x	x				x		x																x				x				x	x												
Long Beach City Coll., Long Beach										x																	x																		x
Napa Junior Coll., Napa																													x															
Sacramento City Coll., Sacramento																																x	x											
San Benito Coll., Hollister																																							x					
San Bernardino Valley Coll., San Bernardino										x																						x											
San Jose City Coll., San Jose																													x														
CONNECTICUT																																													
New Haven Coll., New Haven							x	x		x	x	x									x							x																
DELAWARE																																													
Wesley Coll., Dover																																													
ILLINOIS																																													
Moline Community Coll., Moline																					x																								
Southern Illinois Univ., Carbondale																																													
IOWA																																													
Fort Dodge Jr. Coll., Fort Dodge																																													
Muscatine Jr. Coll., Muscatine	x					x	x	x			x																																		
KANSAS																																													
Coffeyville Coll., Coffeyville																																													
El Dorado Jr. Coll., El Dorado																																		x											
MARYLAND																																													
Baltimore Jr. Coll., Baltimore																					x													x										
MICHIGAN																																													
Flint Jr. Coll., Flint																																													
Grand Rapids Jr. Coll., Grand Rapids																																		x	x										
Henry Ford Community Coll., Dearborn							x			x	x										x									x			x		x									
Highland Park Jr. Coll., Highland Park																																		x											
Jackson Jr. Coll., Jackson																																		x											
Northern Mich. Coll., Marquette																													x					x	x										
Western Mich. Univ., Kalamazoo																													x					x	x										

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